

ABSTRACT OF THE DISCLOSURE

Carbon dioxide refrigerant is circulated through a vapor compression system including a compressor, a gas cooler, an expansion device, and an evaporator. Carbon dioxide is extracted from a vehicle exhaust stream that includes combustion products of burned hydrocarbon fuel. The extracted carbon dioxide is used to supplement the initial supply of carbon dioxide refrigerant to maintain a desired (or predetermined) level of refrigerant in the system. The system includes a sensor assembly that measures and monitors the amount of refrigerant in the system. In one example, the extracted carbon dioxide is automatically added to the system from a storage tank when a sensor detects that the amount of carbon dioxide refrigerant in the system is below a threshold value. In another example, the extracted carbon dioxide is directly added to the system, and the carbon dioxide refrigerant is purged from the system when a sensor detects that the amount of carbon dioxide in the system exceeds a threshold value.

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